PENSION PLAN

Infinite annuities

(Interest period = payment period)

- How much money (*budget...B*) you need for an infinite pension paid four times annually, if the interest rate is 2.1 % p.q. and the bank calculates the interest quarterly. The pension is paid ahead (at the begining of a payment period) and the amount of the pension is $500, 00$.

$$B = 500 * \frac{1}{1 - \frac{1}{1 + \frac{0.021}{2}}},$$

whre the $q = \frac{1}{1 + \frac{0.021}{2}}$,

since the interest rate is for 6 months and the interest period is a quarter i.e. 3 months.

- ... the pension is paid after (at the end of a payment period).

$$B = 500 * \frac{\frac{1}{1 + \frac{0.021}{2}}}{1 - \frac{1}{1 + \frac{0.021}{2}}}$$

(Interest period > payment period)

- How much money you need to assure an infinite pension paid monthly with in the amount of 150,00? The pension fund offers you an interest rate of 8% p. a. and the interst is calculated

semiannualy, ie. every sixth month. It is ahead pension.

$$B = 150 * 6 * \left(1 + \frac{6+1}{2*6} * \frac{0.08}{2}\right) * \frac{1}{\frac{0.08}{2}}$$

- ... the pension is paid after.

$$B = 150 * 6 * \left(1 + \frac{6-1}{2*6} * \frac{0.08}{2}\right) * \frac{1}{\frac{0.08}{2}}$$

Note: 8 % is for one year and the interest period is 6 months, so $\frac{0.08}{2}$.

(Interest period < payment period)

- What is the budget that will assure you an infinite ahead-paid pension of 3000.00 once a year? The financial institution promises 7 % p. a. and the interest period is one month.

$$B = 3000 * \frac{1}{1-(\frac{1}{1+\frac{0.07}{12}})^{12}}$$

- ... the pension is paid after.

$$B = 3000 * \left(\frac{1}{1+\frac{0.07}{12}}\right)^{12} * \frac{1}{1-(\frac{1}{1+\frac{0.07}{12}})^{12}}$$

Note: the monthly interest rate is $\frac{0.07}{12}$, thus the q for the sum of geometric serie is $q = (\frac{1}{1+\frac{0.07}{12}})^{12}$.